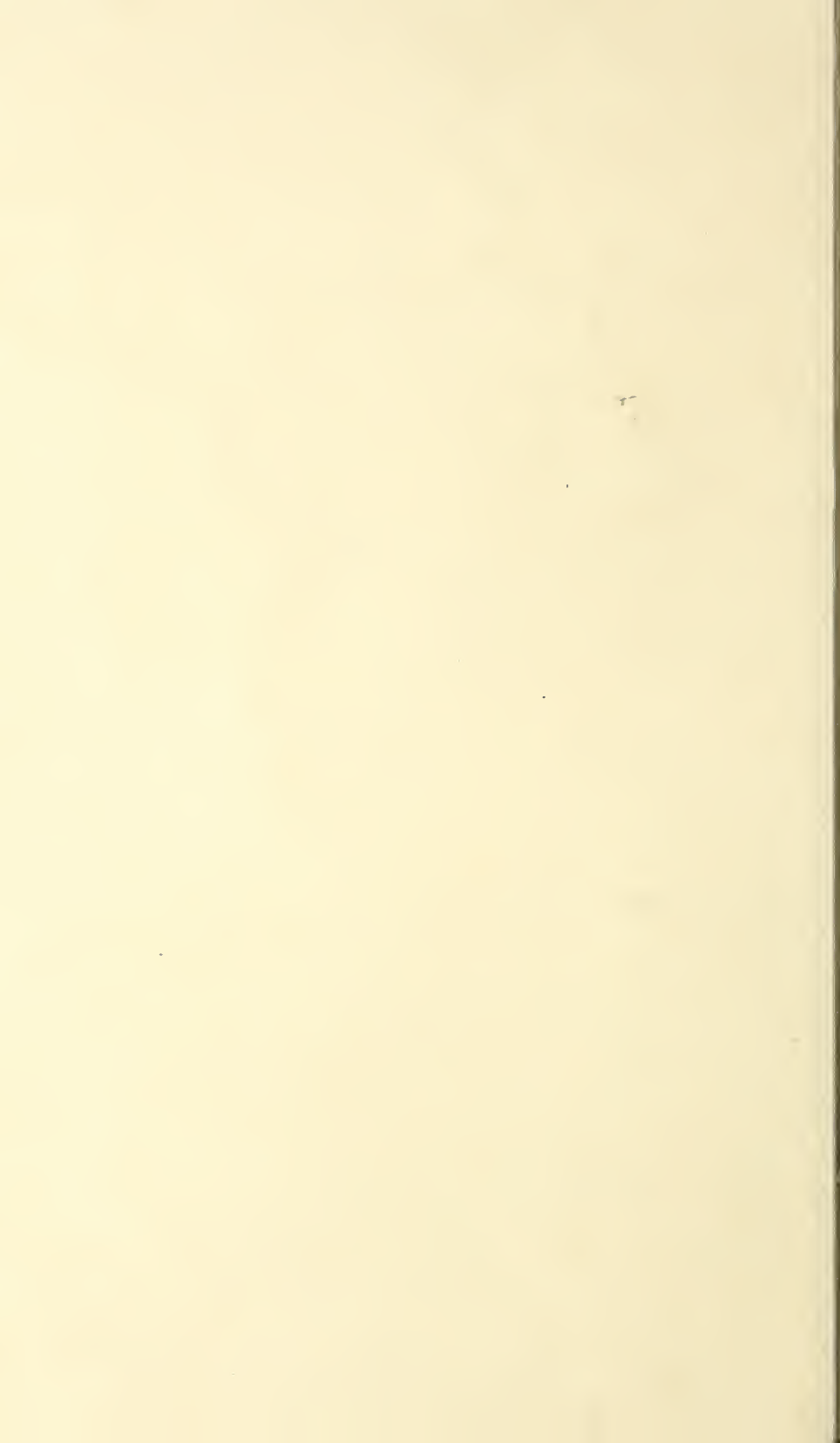


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UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY—Circular No. 107

THE AGRICULTURAL SITUATION FOR 1918

A SERIES OF STATEMENTS PREPARED UNDER THE
DIRECTION OF THE SECRETARY OF AGRICULTURE

PART XI POULTRY

ONE HUNDRED HENS ON EVERY FARM— ONE HUNDRED EGGS FROM EVERY HEN



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WASHINGTON, MARCH 25, 1918

**PUBLICATIONS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE
RELATING TO POULTRY.**

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NATIONAL NEED FOR MORE POULTRY.

MEAT can be produced from poultry more quickly than from any other source. One of the necessities imposed upon the United States by its entrance into the world war is to produce more meat than it has ever produced before. This is essential not only to meet its own greater needs because of being on a war basis, but also to save the countries with which it cooperates in the war from defeat through lack of food.

Meat is one of the most essential of food products. Of such meats as can be cured and kept in compact form, larger quantities than ever before must be sent to the armies overseas, and the proportion of these exports to the total production in the United States is likely to increase steadily and even rapidly, as larger armed forces from this country are sent to the fighting front in Europe.

In order to leave available for the forces overseas as large a proportion as possible of the output of cured and compact meats, it is desirable that there be a decided increase in both the home production and the home consumption of white meats such as poultry. To that end it is imperative that the productive stock on general farms and in the back yards of the Nation be rather largely increased during the current year. It has always been and will always be true that the great bulk of this country's poultry is produced not on specialized poultry farms but in the dooryards and farm lots of the diversified farms. Establishments devoting their attention exclusively to the production of poultry have been and will continue to be of rather large importance, but they can hardly be looked to for any very great part of an emergency increase in production sufficient to constitute a noticeable factor in feeding the world at war. That demand upon the Nation's potential production capacity can be met, however, by the farmers and home makers of the country without any sort of strain and with compensation in poultry profits more than commensurate with the outlay of money and effort.

STANDARD OF ONE HUNDRED HENS ON EVERY FARM.

There should be 100 hens on every farm in the United States. We should obtain 100 eggs from every hen. With approximately 6,000,000 farms, that would mean 600,000,000 hens and 60,000,000,000 eggs per year. That number of eggs constitutes a military resource not to be ignored.

One hundred hens on every farm is not a particularly big contract. There is hardly a farm in the United States but could support that number of hens practically on its waste materials and without materially added cost. One hundred hens to a farm is considerably less than the average number of hens to a farm in many of the better poultry-producing sections of the country. It is an average that could as easily be maintained in the sections of the country where the average per farm is now lower than 100 hens. One hundred eggs from every hen, while far below what could be obtained with proper encouragement of fowls, is considerably more than the average egg production the country over. Suggestions for attaining this average are given in later paragraphs.

These two items are the basis of the war emergency poultry program for 1918. The carrying out of that program is an important part of the war against barbaric domination.

Two causes combine to bring the necessity for a special effort to secure the raising of more poultry this year. One is that the war needs of the Nation make larger average stocks of productive poultry important. The other is that the number of fowls on farms has, from a multiplicity of causes, been reduced during the past year.

A succession of sharp advances in prices of poultry feeds in 1917 and uncertainties in supplies of feeds, because of congested transportation, caused many poultry keepers to curtail production or reduce stocks on hand. As was inevitable under the circumstances, the sections of the East where poultry keeping was most highly specialized were most affected. Shortage of feed in drought-stricken areas in the West and Southwest also led to reduction of poultry stocks on general farms in those areas.

Elsewhere flocks appear to have been maintained at about normal numbers, and in some places slightly increased. Reports of heavy selling in sections where feed is sufficient have in many cases failed to take into account the disposition of the stock sold. It has usually been assumed that all stocks sold went to slaughter. Some reports, however, state that many hens and pullets sold by poultry keepers who were short of feed or of capital passed to others who were in a position to hold them. The volume of receipts of eggs at certain markets seems to bear out this statement.

GENERAL DECREASE IN PRODUCTIVE STOCK.

The probable reduction of eggs and poultry in 1917 for the whole country, as indicated by receipts at New York—the largest market—is about 10 per cent. In its relation to the general food problem this is not a serious shortage when the situation is understood and its possibilities and necessities duly considered by all interested. Poultry can be multiplied so rapidly that a comparatively small general increase in the sections which produce a large surplus of eggs and poultry may more than compensate for heavy local shortages in sections where the industry is more specialized.

The serious phase of the situation is the handicap which the high cost of feed places upon specialists in the production of superior market eggs and poultry. Most of them have had to curtail operations, and some have thought it wise to discontinue production temporarily. Most of the poultry dealers of this class recognize that even apart from the extraordinary effects of war conditions, general economic changes were making necessary various readjustments in their business. It is a special hardship to these poultry keepers to be obliged to make these readjustments under unfavorable conditions, but with the prices of poultry products rapidly rising to their normal level, as compared with other foods, the outlook for them steadily becomes brighter. It is generally recognized that this class, which is most adversely affected by the present high prices of poultry feeds, will benefit most in the period of unequalled prosperity for poultry keepers which will follow the return to normal feed prices. This hope alone gives ample encouragement to them to keep their plants on an efficient footing.

The Bureau of Crop Estimates has collected the following poultry statistics from reports of 25,000 of its correspondents. Figures for 1916 are estimates:

	1917.	1916.
Layers	1,625,929	1,698,438
Non-layers	1,636,083	1,602,845

While these figures are not strictly comparable with the figures of the last census, they appear to indicate a reduction of about 6 per cent since 1910.

The only available poultry and egg statistics covering a long period are the tabulated receipts at seven leading markets as they are published in the Yearbook of the Department of Agriculture, beginning with the reports for 1891; and those in the files of the New York Produce Review, covering receipts of poultry, dressed and live, as well as receipts of eggs at New York. Below are given the receipts for New York, for the years 1911-1917, as taken from the New York Produce Review.

Poultry receipts at New York, 1911-1917.

Year.	Dressed poultry.	Live poultry.	Eggs.
	<i>Packages.</i>	<i>Cars.</i>	<i>Cases.</i>
1911.....	1,015,729	4,875	5,016,721
1912.....	1,054,121	5,607½	4,723,558
1913.....	1,082,273	5,806	4,666,117
1914.....	1,054,918	6,537	4,762,176
1915.....	997,156	6,334	4,582,218
1916.....	1,070,417	6,871	4,864,343
1917.....	946,347	6,064	4,357,061
Shortage for year.....	124,070	807	507,282

Receipts of eggs at New York run very regularly at about one-third the receipts at the seven leading markets included in the Yearbook tabulation. On this basis there is indicated a shortage in these markets, as compared with last year, of 1,521,846 cases.

The figures that have been given plainly reflect a depression in the poultry industry beginning in 1912, and, with occasional partial recoveries, continuing to this time. These figures are even more significant when compared with the receipts at seven leading markets as given in the Yearbook for the years 1891-1910, when the average annual rate of increase was approximately 7 per cent, as compared with an average annual increase of only a little over 2 per cent from 1911 to 1916.

OPPORTUNITY FOR GENERAL FARMERS.

If poultry is to play the part that it should play in feeding the Nation and winning the war, not only will the deficiency created during the past year have to be made good, but there will have to be added something to the average as it stood before the 1917 depletion began. The duty and the opportunity falls upon general farmers and upon families in cities and towns who have enough back-yard space—and that means much less space than may be ordinarily considered necessary—to keep enough hens to supply their own tables with eggs.

The farmer who raises the ordinary grains and keeps some live stock has perhaps the greatest opportunity that has ever come to him of making profit from poultry. For the special poultry farmer the possibilities for profit are perhaps not so large as they used to be, and that fact may have led some general farmers to believe that the situation applies in the same way to them; but there exists just here an unusual paradox. The very conditions that may make poultry and egg production a losing enterprise on the specialized poultry farm tend to make it an increasingly gainful one for the general farmer. Where nearly all of his feed has to be bought at high prices, the margin between cost of production and proceeds from sales becomes extremely narrow, but where practically all of the poultry feed is made up of waste materials that would otherwise not be utilized in any manner, the percentage of profit becomes very much larger when prices are high than it ever could have been when prices were low. Poultry on

the farm obtains a very large part of its feed by foraging, by glean- ing the waste from stable yards and feeding lots, by consuming the scraps from the kitchen door, by preying upon insect pests in pasture and field, and in only a relatively small degree from grain or other com- modities that would be marketable. A farmer whose poultry is fed in this way may count all of the money received for eggs and surplus poultry as practically clear profit. When, therefore, eggs and poultry are selling at higher prices than have usually been obtainable, the farmer's margin of profit without expenditure is very greatly increased.

It is, therefore, to the farmers of the country that the Nation must look for the greater part of the immediate increase of poultry products which will make it possible to supply fully our own army and navy with red meats and at the same time furnish the Allies with the animal foods they need.

In urging the farmers of the United States to produce more poultry and eggs the Department of Agriculture is not unmindful of the scarcity of labor on farms and the many demands upon the time and strength of all members of farmers' families. The means of increasing production which are suggested have been carefully considered with reference to economy of time and labor and to the profitable adjust- ment of poultry work to other interests of the farm. Any considerable increase of poultry production must involve some increase of care and labor, but development along the lines and on the scale advised should amply justify the effort from a financial as well as from a patriotic standpoint.

It should be borne in mind that an increase in poultry production is sought not for this year alone, but for the entire duration of the war.

It is not urged that novices without experience engage in poultry keeping on a large scale. That is recognized as a poor policy at any time and more likely to lead to failure and eventual decrease than to a steady and permanent increase in production. What is urged is that those who are already poultry growers to some extent and possess the information and ability necessary successfully to increase their stock and production should do so.

POULTRY CONVERTS WASTE INTO FOOD.

The central thought to be borne in mind in considering the growing of more poultry as a war necessity is the fact that the keeping of poultry is a means of converting into good food materials that can not be utilized by man, that can not be eaten by any other kinds of stock, and that, without the poultry, would be absolute waste. Very clearly, it becomes a national as well as an individual duty to keep enough poultry to take up all such waste materials. As long as fowls take the bulk of their feed from such sources and require to be fed on grain or other garnered feeds only as a finishing process, additional food is being created.

Careful planning must be done, of course, to insure the utilization of as many kinds of waste materials as possible and to avoid overstocking with any one kind of poultry that would not be fully fed from the particular kinds of waste which it eats and would, therefore, require to be largely fed from garnered materials.

Chickens, in any general scheme of poultry production, of course, must take first place. They are best adapted to general conditions, take a wider range of feeds and convert them, perhaps, with the greatest margin of profit. Chickens, better than any other class of poultry, utilize table scraps and the general run of waste from the kitchen door, all the way from apple and potato parings to sour milk. Chickens far surpass all other kinds of poultry in salvaging waste grain from the stables, from the shed or lot where the cattle are fed, and from hog pens. During the winter months, on farms where any considerable number of live stock are kept, the 100 hens suggested would take their living from these sources with only slight additional feeding from time to time. Chickens are great destroyers of insects, including many injurious forms, in yard, pasture, and orchard. They utilize, also, many grasses and weeds, and seeds from the same, that would otherwise be of no use. Except in isolated instances, the part of wisdom would be, undoubtedly, to keep more chickens than all other kinds of poultry combined, but there should be, in a majority of cases, some of all the other common kinds of poultry.

ECONOMIC USES OF DIFFERENT FOWLS.

Turkeys, ranging farther afield, prey upon insect forms that escape the hens. From the time the young are old enough to begin foraging for themselves, perhaps early in June, until near frost, turkeys take the bulk of their food from field insects, devouring millions of grasshoppers and other injurious forms in meadow and pasture. In regions where wooded areas are still fairly extensive, mast is an important item in the diet of the turkey. When the insect stores begin to fail, the mast larders are beginning to be filled. Feeding on acorns, chestnuts, beech nuts, and the like, turkeys will go a long way toward fattening themselves for the Thanksgiving or Christmas market and will not require much feeding of corn or other grain to finish them. Generally speaking, turkeys will require a larger feeding of grain than chickens to fit them for market, but, as they utilize forms of waste that hens and their broods would not reach, the keeping of a fair number of turkeys is good economy.

Guinea fowls utilize still other kinds of waste that would escape both hens and turkeys. Taking a wider range than chickens and yet not quite so wide as turkeys, keeping largely to thickets and weed patches, and committing fewer depredations against field and garden than either chickens or turkeys, requiring little feeding at any time, being prolific layers, during their season, of eggs that are thought by many to

have a richer and finer flavor even than hen eggs, the guinea fowl is an economic necessity on any farm where a serious effort is made to convert all waste into meat and eggs.

Geese hold still another sector in the line of the poultry army that makes war against waste. They touch flanks with the chickens in utilizing waste grain about stables and feeding pens. In a larger measure than chickens or any other kind of poultry, they are grazing stock, taking their living in large part from the ordinary grasses of the pastures. When the facts are taken into consideration that the demand for geese is strong, steady, and extended over practically the whole year, not confined to certain holiday seasons as the demand for turkeys largely is, that geese excel all other kinds of poultry as producers of fat, a thing of which the world stands at present in dire need, and that their value as egg producers is considerable, the importance of an adequate number of geese in the poultry scheme becomes apparent.

Geese, in common with ducks, are utilizers of forms of feed confined to ponds and streams, but they are, in that particular, excelled by ducks. On farms where ponds or streams are available, ducks will convert into meat and eggs great quantities of water insects and various aquatic forms that would not be utilized by any other kind of poultry. Ducks, while they consume much grass and other green stuff, are more partial to animal feeds and are very energetic in patrolling the branches, creeks and ponds as sources of food supply. Where conditions are favorable, they will provide for their own food needs in a measure that will make them highly profitable.

The one kind of poultry of questionable economic status on farms is the pigeon. Almost exclusively a grain eater, the pigeon renders no notable service as a conserver of waste, except it might be shattered grain in the fields, and that in large measure would be taken up by other poultry and by pigs. The pigeon has its economic place in the scheme of urban poultry production, but, except in isolated instances where conditions are peculiarly favorable, its production on general farms may not be desirable.

The hen, first and last, is the main dependence for increasing the supply of white meat and eggs, but she requires the aid of turkeys, guineas, geese, and ducks, just as, on a dairy farm, the cow requires the aid of pigs, sheep, and goats. The setting of the standard at 100 hens per farm is safe, but no such arbitrary standard can be set for the other kinds of poultry. The small farm, with grain fields of neighboring farms in proximity to the barn and dooryard, would, perhaps, be better without turkeys. The farm through which no streams run and which has no large pond would perhaps be better without ducks. But the circumscribed farm on which turkeys would be a disadvantage may be well supplied with streams and ponds so that ducks would be unusually profitable, and the farm that has no streams and ponds

may have large range for turkeys. Each farm family will have to determine for itself what poultry can be profitably kept in addition to 100 hens, bearing in mind always that an adequate number should be kept of all the kinds for which free range can be found.

IMPORTANCE OF GOOD BREEDING STOCK.

Inasmuch as most farms have already some supply of poultry, the problem for the farmer is one of increase and not, like that of the city dweller who undertakes to keep hens to supply his own table with eggs, one of securing the foundation stock. While the American standard breeds are, for general purposes, the best, it is not urged that they be made to supplant other breeds where the other breeds are established and where they can be produced with a fair degree of success and of profit. The American standard breeds, broadly speaking, are the larger breeds of general-purpose fowls, good producers of both meat and eggs, as distinguished from the small breeds that are specialized egg producers. Farmers and farmers' wives who have built up their own flocks, and know the peculiarities of their breed and how to make the most of them, will do best by keeping the hens that they have, even though they be small and inferior as meat producers, instead of trying to replace them with heavier ones at this time. Wherever possible, eggs from larger breeds should be secured for setting under the small hens, so that the chicks of this year's growing will be of good size and of fairly early maturity.

In growing chicks, the quality—the vigor, vitality, and capacity for growth—that the chick has when it starts in life count for at least as much as good conditions and good care.

Also, in growing stock for layers, it is especially important at this time, when a large increase in meat products is needed, to avoid breeding from undersized specimens. Whatever may be the facts as to the relative value of large and small hens as layers, as that question relates to standard breeds, the question is irrelevant in this farm poultry production campaign, for farm hens are nearly all small according to standards for improved breeds of fowls.

The ordinary farm flock contains a large proportion of hens quite unfit for breeding—having no quality which it is desirable to reproduce. The eggs from these should not be used for hatching, but, as far as possible, eggs used for hatching should be from the best hens in the flock. To determine how many of these are needed, an estimate must be made, basing it upon the usual hatchability of eggs, and the probable length of the hatching season.

The ordinary average of hatches extending over a period of several months is about 70 per cent. If all chicks are hatched early the length of the hatching season is about six weeks, from the setting of the first to the setting of the last hen used. Allowing two weeks for saving eggs before the first hens are set, the eggs used for hatching must be

laid within eight weeks. Allowing for rejections of small and defective eggs, provision should be made for about 500 eggs in eight weeks. This means a flock of 15 to 20 hens as breeders. Such a number of the best of the flock should be separated from the rest.

As a matter of convenience it will probably be more satisfactory in most cases to confine the culls and give the portion of the farm flocks used for breeders the usual accommodations and range. The culls may be shut in small quarters without yard if necessary, while that is not advisable for breeding stock.

The next thing to consider is the male. In many cases it will be to the advantage of farmers undertaking to increase and improve their flocks to buy standard males of general-purpose breeds because of the additional size and weight such males will give the chicks, to say nothing of the probable increase in egg production. From one to two pounds extra weight can be put on the chicks from ordinary farm hens by using males of approximately standard weight of Rhode Island Reds and Wyandottes, Plymouth Rocks and Orpingtons.

NECESSITY FOR EARLY HATCHING.

Special emphasis is due the importance of early hatching, because that is the key to the whole situation. While chickens can be hatched at any time of the year, it is the chickens hatched early in the spring that give the best results, and unless a special effort is made to hatch early on the farms throughout the country, the hatching season coincides too closely with the planting season, and hatching operations are reduced on that account.

Early hatched chickens give the best results. They are, as a rule, the strongest and most vigorous because they are produced from eggs laid while the hens are in their best breeding condition. After a long period of laying, hens lose something of their vitality and their capacity to transmit vigor to their offspring, and so late hatched chickens are, on the whole, decidedly inferior to early hatched in vigor and constitution.

Because they are more thrifty and vigorous, early hatched chickens make quicker, better, and cheaper growth than late chickens. Thrifty chickens get more from a given quantity of feed than others. Weak and undersized chickens often consume as much feed as larger and better developed birds and still make no perceptible growth.

Early chickens develop to the stage where they can withstand extreme heat, and the attacks of parasites—which are most numerous and troublesome in hot weather. Late chickens are likely to be caught by severe heat just at the stage of their growth when heat is most debilitating to them. In their weakened condition they then become an easy prey to lice and mites, their growth is interrupted, and when the cold wet weather comes in the fall they are peculiarly susceptible to it,

and likely to develop colds, while vigorous early chicks find the coolness stimulating and are not injured by the dampness.

Early hatching reduces the risks due to the vicissitudes of hatching. When eggs do not hatch well early in the season there is time to find the reason for poor hatching and correct it before the season is too far advanced to get reasonably early chicks in the numbers desired. In that case poultry production may not be reduced at all, and egg production is retarded only a few weeks. When late hatching is not successful the crop of poultry is cut short and egg production fails.

Early hatched cockerels are ready for the market when prices are highest. Early hatched pullets lay when prices of eggs are highest.

POULTRY PRODUCTION IN BACK YARDS.

Poultry and eggs have never been cheap food for the city dweller and there is no hope that they can be, during the continuance of the war and its necessarily attendant high prices, even as relatively cheap as they have ordinarily been. The only possibility of cheap eggs for the city family lies in keeping enough hens in the back yard, where they can be supported principally on kitchen waste, to supply the family table. The keeping of hens in back yards is at once an economic opportunity for city families and an essential part of the campaign for increasing poultry production.

What may be done with fowls in a back yard depends upon the size of the yard, the character of the soil, the conditions of sunlight, shade and ventilation, and the interest and skill of the poultry keeper. The smallest and least favorably situated back yard affords an opportunity to keep at least enough hens to supply eggs for the household. The number of hens needed for that purpose is twice the number of persons to be supplied. Hence the smallest flock to be considered consists of four hens. Where hens are kept only to furnish eggs for the table no male bird is needed.

A coop for a flock of four hens should have a floor area of about 20 square feet, or about 5 feet per hen. For larger flocks the space allowance per bird may be a little less, because the space is used in common and each bird has the use of all the coop except what her companions actually occupy. For the ordinary flock of 10 to 15 hens the space allowance should be about 4 square feet per hen.

With proper care the back-yard poultry keeper can keep hens, for laying only, confining them continuously to their coops, and have them lay well nearly as long as they would be profitable layers under natural conditions. While hens like freedom, good feed and care reconcile them to confinement, and mature, rugged birds often lay more eggs in close confinement than when at liberty.

If the space admits of giving the little back-yard flock more room than a coop of the minimum size required, the condition of the land

will determine the form in which the additional space should be given. If the soil is well drained and free from such filth as often contaminates the soil of small back yards, a yard for the fowls may be fenced in, allowing 20 to 30 square feet of yard-room per bird. The opportunity for exercise on the land and in the open air which this gives the hens will benefit them, and make life for them more interesting.

If the soil is poorly drained and foul, the hens will thrive and lay better if not allowed on it at all. In that case, the best way to give them some benefit of the extra space available is to build adjoining the coop a shed covering about the same amount of ground, and having the front enclosed only with wire netting. The foul earth under this shed should be removed and the floor filled in a few inches higher than the old surface with fresh earth or sand.

By proper attention to cleanliness this may be kept in sanitary condition for a year or more. Whatever advantage can be given the hens in this way will tend to increase production, and to prolong the period of profitable laying. The eggs of hens kept in small back yards are perfectly good for eating, but of little value for hatching even when fertile. Good chickens cannot be grown under such conditions. The hens will usually lay well for about a year. Then they should be replaced with farm-grown pullets.

It is known as a matter of experience and observation that town and city people who have to figure costs of food closely have not been accustomed to use eggs freely except in the season of flush production and low prices. A great many such families can keep a few hens in the back yard, and even with low production get many more eggs than they have been accustomed to use.

AN EGG PER DAY PER PERSON.

The average novice can reasonably expect to get an average of at least ten dozen eggs per hen per year from his small flock in the back yard. On the basis of two hens to each member of the family this will give 20 dozen eggs a year to each person, which amount is about half-way between the general average of farm and city consumption. No back-yard poultry keeper should be satisfied with less than this. Every back-yard poultry keeper should try to get as much more as possible.

To provide an egg a day for each person, two hens would have to lay 183 eggs each per year. This is by no means an impossible average for small flocks. It is perhaps not too much to say that in cases where the person attending the flock is practically "on the job" all the time, that is, in a position to look after the wants of the birds three or more times a day, an average of better than 13 dozen eggs per hen can easily be secured, if the hens are mature and in good condition at the start, and have the vitality to carry them through a year of heavy laying.

For the farm the average of 100 eggs per hen is advised as the lowest that should be accepted as satisfactory, while for the back yard 120

is insisted upon as the lowest average—although, in general, the conditions in back yards are less favorable to poultry keeping than on farms.

Experienced poultry keepers understand why this is. The appropriate methods for the farm flock are very different from the appropriate methods for the back-yard flock. On the farms *extensive* methods are used, with the object of saving labor wherever that can be done to advantage, while in the back yard where the size of the flock is necessarily small and all wants of the bird must be looked after by the person in charge, *intensive* methods must be used, and every effort made to get high production.

On the farm the poultry keeper can greatly reduce the work of caring for the fowls and at the same time give them the opportunity to pick the most of their living by distributing them on the land. In the city back yard the birds could not, under any circumstances, pick any considerable part of the feed they require. Practically everything must be supplied them, hence any negligence on the part of the keeper affects results more unfavorably than when the hens are under farm conditions.

Yet there is nothing difficult in the care of a small flock if each of the things necessary to do is done at the right time in the right way, and this system involves nothing too hard for a child, or beyond the ingenuity of an adult who cannot look after the fowls as closely as the child whose time is divided between home and school.

Hens of the medium-sized breeds—Plymouth Rocks, Wyandottes, Rhode Island Reds and Orpingtons—are best suited to back-yard conditions. Large hens kept in close confinement are likely to get too fat to lay well. Small, nervous hens are apt to develop such vices as egg-eating and feather eating. The bad tendencies mentioned do not prohibit the keeping of large and small breeds in small back yards, but make it necessary for the keeper to use extraordinary care to keep them in good condition and productive. White and light-colored varieties are not desirable for small back yards, because their plumage soils too easily.

As a rule it is most satisfactory to buy hens of a local poultry keeper or dealer in live poultry. Desirable small flocks are frequently offered by people who are obliged by change of work or of residence to sell their poultry. Dealers in live poultry everywhere sort out from their general receipts the hens that show good breeding and quality to sell to back-yard poultry keepers. When satisfactory stock can not be obtained locally, the advertising columns of poultry papers, agricultural papers, or newspapers that carry poultry advertising should be consulted, and the hens bought from the nearest breeder who can supply what is wanted at a reasonable price.

For the back-yard flock kept to produce eggs only it is not necessary to have hens of extra good standard quality. What breeders of stand-

ard poultry call choice utility hens are as good as any for egg production and cost but little more than ordinary mongrels. Hens of this grade in the medium-sized breeds are usually a little under standard weights, and have superficial faults—as unsoundness of color, or irregularity of markings or of the shape of the comb—which in no way affect their laying capacity but make them unfit for exhibition and undesirable for breeding purposes.

When buying hens in person, particular attention should be given to the general condition—whether the bird seems vigorous and lively—and to the appearance of the comb and the condition of the feet. Healthy hens have bright red combs and bright eyes. A slight paleness of the comb is simply an indication that the hen is not laying at the time; but a bird whose comb has either a yellowish or a bluish cast should be rejected, for these are symptoms of internal disorders. The skin and scales of legs and toes should be smooth, and the soles of the feet soft and free from corns.

BREEDING POULTRY IN SMALL SPACE.

The average city family will, perhaps, do best by keeping hens for eggs alone, but a considerable degree of success can be attained in breeding poultry in back yards and in many instances it may be desirable.

By *breeding* poultry is meant mating a male and one or more females to reproduce the parent type; hatching the young, and so rearing them that they will attain the full development of good typical specimens of their race. In a small way this can be done in quite a limited space. It is more difficult than keeping a small flock of hens for eggs for the table, or growing a few chickens for the table in the same space, but with regular attention and good care very satisfactory results are obtained. Good work under adverse conditions often gives better results than poor work under good conditions.

The smallest breeding pen for work on this scale and with only one mating should have a male and two females. With two hens, the pen will provide eggs for hatching at the rate of a sitting every week or ten days, thus making it possible to set all eggs while the germs are strong. If a small flock is kept also for eggs for the table, hens from that flock may be used to hatch and brood the chickens. If the laying hens lay eggs of a different color from those laid by the breeding hens, all may be kept together. The layers may not produce as many eggs while fed as breeders should be, but there is a saving in space and work, and the net result may be as good as if more eggs were secured.

Rations for breeding stock differ from laying rations in that much smaller proportions of commercial animal foods are used, and special attention is given to supplying green feed regularly and abundantly. Heavy egg production is not desired. The object is to have the birds

in perfect physical condition and at the height of vitality, that they may more surely transmit these qualities to their offspring.

The greatest difficulty in back-yard breeding is rearing the young birds to secure their best development. As growing birds are more susceptible to adverse conditions than mature birds, and birds in close confinement are less rugged than those at liberty, the back-yard breeder must give the most scrupulous attention to every detail of the care of his young chickens. Shortcomings which might have no bad consequences with the adult birds, or with young chickens under more favorable conditions, may have very serious ill effects upon his young stock. However, by looking properly after all their wants and taking care not to overcrowd them in any way, fine specimens may be grown in yards where the space allowance is not more than 20 to 30 square feet per bird.

PROFITABLE POSSIBILITIES IN PIGEONS.

The back-yard poultry keeper can hardly hope for success with turkeys, geese, ducks, or guineas, but for those who have lofts over garage, stable or coal shed, the opportunity for squab growing is well worth considering.

For food purposes pigeons are usually classed with poultry. Culturally they are in a class by themselves, producing meat only, producing it very quickly, and able to produce well under conditions that do not admit of growing any other creature used for food.

While the ideal arrangement for pigeons is to have their house on the ground, and a small covered yard, called a "fly," connecting with it, pigeon keeping may be carried on quite extensively in upper rooms, or lofts, with or without open air flies. Many flocks of pigeons are kept in large cities in quarters provided for them in the lofts or on the roofs of buildings used for mercantile and manufacturing purposes.

A space 6 feet square, and high enough for the attendant to stand erect, will accommodate eight to ten pairs of pigeons for squab breeding. The birds mate and begin breeding when six to seven months old. The male shares with the hen the duty of incubation. The young hatch in about seventeen days. At four weeks old, average good squabs will weigh about three-quarters of a pound each. Some of the larger ones will weigh over a pound at that age.

A good pair of breeders will produce six or seven, or more pairs of squabs a year. As many as eleven pairs of squabs have been produced by one pair in a year. When production is high the female lays and begins incubation while she has young still in the nest, leaving the care of them to her mate.

Raising squabs has greatly increased in cities in recent years. On farms the tendency has been the other way. On a farm a flock of free pigeons, if not kept down by killing off the increase, soon becomes a nuisance, destroying grain and doing a great deal of damage, especially on new-seeded ground.

The remedy for this is to keep the pigeons under control, and use the young birds, except the few needed to keep up the flock, as fast as ready for the table. By establishing the flock of pigeons in an accessible place, giving them a little food occasionally in their loft, and keeping them shut in and feeding them when they could damage new-seeded ground, a farm flock of pigeons can be made to contribute substantially to the meat supply, and still be prevented from doing any serious damage.

NEW OPPORTUNITIES FOR SPECIALISTS.

While the main effort in the campaign to increase the Nation's stocks of productive poultry is to be directed to the general farmer and the city householder, it does not follow that the specialist in poultry production can not render good service in this cause. He may find it desirable and conducive to his greater profit to diversify his farming by devoting more attention to live stock other than poultry and to producing a larger proportion of his feedstuffs on his own ground.

It may be doubtful in some cases whether a special poultry farm can operate profitably along the same lines as in the past. The grower of table poultry can use his stock, plant and equipment for production along some other line that will be profitable at this time. Indeed, in most cases he must so adapt his business to changed conditions or sacrifice what he has invested in it.

Every farmer who becomes interested in increasing and improving his farm poultry, and every town resident who begins to keep poultry in the back yard is going to buy stock or eggs for hatching, or baby chicks. This should cause at least the normal demand for birds, eggs, and stock in the early part of the year, and also stimulate demand for pullets next fall.

The attention of poultry breeders who want to produce to meet popular demands may well be called to the advantage of the "farming out" method of producing stock in quantity. Farmers who are interested in increasing and improving their stock and town people who have room to grow more chickens than they wish for themselves will in many cases find it an advantage to grow stock for a breeder in their vicinity. With so much new interest developing, it should be easier than usual to get breeders and the poultry keepers near them to co-operate in the production of fowls, for laying especially. Such an arrangement is to the advantage of both. It reduces the cost of getting good stock to the grower and the risk on growing stock to the breeder.

The success of this line of work and cooperation depends very largely upon early hatching, and that in turn depends much upon the breeders beginning at once to interest their neighbors in growing chickens for them. Whether he farms out stock or not, every poultry keeper who looks forward to better times in poultry culture should do his part to bring them, by producing all that he can handle at home.

BENEFICIAL FUNCTION OF EXHIBITION BIRDS.

There should not be any discouragement of the breeding of what is ordinarily known as fancy poultry. That term is usually applied to the standard breeds as kept by specialists who produce exhibition birds. That practice has always resulted in more or less general improvement of poultry and should continue to perform just that function at this time when the wider keeping of a better grade of poultry stock can not fail to result in an increased production. The work of the poultry specialist also gives encouragement to the general farmer and the back-yard poultry keeper to take better care of the flocks. The continuance of poultry exhibitions, maintained almost wholly by the poultry specialist, is certainly justified during the present emergency. It has always been the breeders of exhibition fowls who have been the leaders in promoting the welfare of the poultry industry, and these men have been especially willing to give their time and efforts in working for increased production. The poultry shows themselves afford an opportunity for interesting individuals in poultry keeping and have served as effective centers from which to launch and extend the campaign for increasing poultry production.

To the specialist in poultry production it is not necessary to say in this connection anything with regard to breeds that should be used, but to the general farmer some suggestions along that line might be of assistance in making the adjustment to changed conditions.

Standard poultry, as the phrase is commonly used in America, is poultry bred to the standards established by the American Poultry Association. The object of making standards for poultry is the same as the object of making standards of weight, volume or quality for any product or commodity; i. e., to secure uniformity and establish a series of grades as a basis of trading in the article.

In making standards for poultry which apply in the process of production, the principal points considered are size, shape and color.

Size and shape are breed characters and largely determine the practical values of poultry. Many standard breeds are divided into varieties differing in color but identical in every other respect. Color is not a primary utility point but as a secondary point often comes in for special consideration. For example, a white variety and a black variety of the same breed are actually identical in table quality, but because black birds do not dress for the market as clean and nice looking as white ones, it often happens that they are not as salable.

When a flock of fowls is kept for egg production only, uniformity in color is much less important than approximate uniformity in size and type, yet the more attractive appearance of a flock of birds of the same color justifies selection for color as far as it can be followed without sacrificing any material point.

When a poultry keeper grows his own stock year after year, he should by all means use stock of a well-established popular standard

breed. By doing so and by selecting as breeders only as many of the best specimens of the flock as are needed to produce the chickens reared each year, a poultry keeper maintains in his flock a highly desirable uniformity of excellence in every practical quality and, with little extra care and no extra cost, can have a pleasing uniformity in color. To the novice in poultry keeping, it often appears that there is no real necessity for so many breeds and varieties as have been standardized in America. Further acquaintance with them, however, shows that although color differences are in most cases merely to please the eyes of persons having different preferences for color, the differences in shape and size which make breed character have been developed with a view to adapting each to particular uses or particular conditions.

Leaving out of consideration the breeds kept as novelties, most of which originated before industrial progress created a large demand for poultry products, all the standard American breeds of fowls have been made and developed on the general principle of practical quality as the foundation of breed character and value.

UTILITY OF THE VARIOUS BREEDS.

In harmony with this principle, the common classification of breeds according to their places in the general scheme of poultry production divides them into three principal classes, laying breeds, meat breeds, and general-purpose breeds—that is, breeds that are not as ready and persistent egg producers as the laying breeds, and not as meaty and as easy to fatten as the meat breeds, yet combine in one individual fowl very good laying capacity with very good table quality.

The Leghorn, Minorca, Andalusian, Ancona and Campine are well known breeds of the laying class; the Brahma, Dorking and Cornish of the meat class; the Plymouth Rock, Wyandotte, Rhode Island Red and Orpington of the general-purpose class.

The breeds mentioned as of the laying class, with the exception of the Minorca, are relatively small, very energetic and lively, mature early, and are easily kept in good laying condition. The Minorca is of larger size and modified somewhat in the other particulars mentioned, yet has more the character of the laying class than of any other.

In the meat breeds, there is not the same uniformity of type that is found in the laying breeds. The three mentioned differ decidedly. The Brahma is most popular because it is at the same time the largest and the most rugged in constitution. The Dorking excels in quality of meat, but is generally considered somewhat lacking in hardiness. The Cornish is rather hard-meated but, being very short-feathered, has its special place as a large meat-producing fowl in southerly sections where the more heavily feathered Brahma does not stand the summer well.

Among the popular breeds of the general-purpose class there are also differences in type, adapting breeds to different uses. The Ply-

mouth Rock is generally regarded as the type meeting the widest range of requirements in the general-purpose class.

The Wyandotte is a little smaller and earlier maturing, but still very well meated and easy to fatten.

The Rhode Island Red has nearly the same standards of weight as the Wyandotte, but is a more active bird, not putting on fat so readily. Consequently, it approaches the laying type and is popular with those who want eggs and meat, but want eggs most.

The Orpington is at the other extreme in the general-purpose class, being a heavier, meatier fowl than the Plymouth Rock.

Such a list of breeds affords so wide a range of choice that poultry keepers can always select a standard breed better adapted to their locality and their purpose than any non-standard stock they can procure, and having the further advantage of reproducing true to type.

SELECTION OF POULTRY FEEDS.

It is probable that concerted and intelligent action on the part of poultry specialists in selecting the kinds of feed they will buy for their flocks could be made to result in considerable saving of first cost and, therefore, in production, at a figure that would leave a margin of profit larger than is now in prospect. This applies with equal, possibly with greater, force to the keeper of poultry in the back yard.

While farmers, as a rule, have fed their poultry the grain that was cheapest on the farm, many poultry specialists and most small poultry keepers have been accustomed to use their favorite poultry feeds without considering either the quality of the supply or the possibilities of using cheaper substitutes.

Under normal conditions, corn is in nearly all parts of the United States the cheapest poultry feed. At the present time, oats are nearly everywhere cheaper than corn. When corn goes down to \$1.50 a bushel, oats should be 75 cents and barley \$1.20 a bushel to give the same value for the money, when fed to poultry, as corn.

The relative commercial feeding values of the grains are most readily computed by using the prices per hundred pounds, taking corn as the standard and determining the relative value of any other grain by a rough comparison of its feeding value with that of corn. It is not practicable to make accurate calculations for this purpose, but one which assumes that, except for indigestible matter and deterioration, the common grains are, pound for pound, of the same feeding value, and rates them accordingly will meet the requirements of the case.

The common characters and conditions of grain which roughly determine their values as poultry feeds are easily estimated by the eye, or by weight or bulk in measures or containers of known capacity.

Good cracked corn is hard, bright, clean, free from soft and chaffy particles. Corn that is crushed (not cracked), and shows much soft, chaffy and scaly matter, should be rated proportionately below good

cracked corn in feeding value. Cracked corn in which any considerable amount of greenish discoloration appears should be rejected as unfit for poultry.

Oats with the hulls on are at once seen to contain more indigestible matter than corn. Again, the indigestible hulls covering oats make that grain less palatable to poultry and its feeding value must be discounted. An average sample of oats should be valued at about 12 to 15 per cent less than a good sample of cracked corn.

Oats weighing less than the United States standard of 32 pounds to the bushel should be discounted in price according to the shortage in weight, while for weights above the standards the usual discount in price may be reduced. Oats that are much below standard weight usually contain a large proportion of grains that are nearly all hull. Poultry will not eat them unless starved into it.

The best wheat usually available for poultry is not actually worth more as a poultry feed than good cracked corn.

Low-grade and damaged grains are suitable for poultry feed if birds in good condition will eat them readily. They can be fed profitably if they have been bought at prices representing their actual values for poultry feeding, as compared with those of other available feeds. Better buying by poultry keepers will not immediately stop the selling of poor feeds at high prices, but eventually it may establish prices for them on the basis of feeding value and the price of the cheapest feed on the market, and not, as now, at a small reduction from the prices of good grades of the same grains.

MORE ATTENTION TO SANITATION.

With all classes of poultry breeders there should be more careful effort than ever before to secure thorough sanitation and thus to prevent disease.

On farms correct sanitation is secured in houses and coops by good ventilation at all times and the removal of the night droppings as often as necessary to avoid bad odor. On the land the desired result is obtained by distributing the stock so that all droppings are taken up as fertilizer by the vegetation growing on it so quickly that there is no soil pollution. Observance of these simple rules will not only prevent all diseases caused by overcrowding and soil contamination, but the young stock reared under such conditions will grow faster and better. Where it is inconvenient to distribute a large stock as widely as is necessary to secure permanently the fine sanitary condition of land desired, the same result is obtained in growth, by a rotation which places young birds always on land not used for poultry the preceding year.

In back-yard poultry keeping scrupulous cleanliness is essential. The night droppings should be removed early in the morning. Those which fall on the floor of the house and in the yard should be removed as

often as is necessary to get them before they become finely broken and so mixed with the litter of the floor or the soil of the yard that much of such material must be taken up with them. Frequent turning of the soil in small yards is desirable, but ought not to be accepted as a proper substitute for removal of droppings there. If these are simply turned under in soil in which no vegetation is growing there is temporary improvement, but after a short time conditions become so bad that renewal of the soil to a considerable depth is necessary. Clay soils should be frequently and liberally treated with lime.

Good sanitation checks the rapid multiplication of lice and mites but does not destroy them. For this the appropriate insecticides should be used. In a series of tests of insecticides by the Bureau of Entomology sodium fluorid was found most effective, completely destroying all lice present at the time of application, and making the birds treated immune to attacks of lice for some time. The methods of using sodium fluorid for lice and of eradicating mites are given fully in Farmers' Bulletin 801.

RECAPITULATION OF ESSENTIALS.

The general features of poultry husbandry outlined herein, if adhered to by farmers and farmers' wives, by city dwellers who have enough space to keep a few hens, and by the poultry specialists of the country, will result in a remarkable increase of poultry and egg production. Only a few essential things are to be constantly borne in mind. First in this list, perhaps, should come careful selection of breeding stock, in order to reproduce a larger percentage of good types of profitable producers. Next to that in importance is early hatching. In order that pullets may be sufficiently mature to become good fall and winter layers, the chicks must be out of the nest as early as possible. For at least two weeks after the chicks are hatched, mother hens should be confined to brood coops to prevent fatality to the brood from exposure to wet and other dangers. From the time the chicks are old enough to be immune from the dangers of wet grass and the like, free range is of first importance for both growing stock and layers. Free range, in the first place, stimulates growth. It also stimulates egg production, and it reduces very materially the quantity of dry feed necessary to keep the flock in condition.

Another matter of prime importance is the production of infertile eggs. As soon as the breeding season is over, every poultry keeper, whether general farmer, specialist, or city dweller, should see that the hens are kept separate from the cocks. If this practice is followed, it will result in the saving of millions of eggs that would otherwise become spoiled, either in the hands of the producer or before reaching the consumer.

When the chicks have reached a marketable age, care should be exercised to dispose promptly of all surplus cockerels, in order to con-

serve feed. As early as possible such pullets and hens as are not profitable producers should be culled out and sold. The greatest of care should be exercised to see that profitable pullets are kept as egg producers. Throughout the year, care should be exercised to prevent the marketing of all profitable hens of the general-purpose class. Hens of this kind should never be sold until the end of their second year, and hens of the Mediterranean or egg class should not be sold until the end of their third laying year. A careful check should be kept, however, on hens and every individual that does not show herself a profitable producer should be sold for meat.

The caponizing of cockerels is to be urged only when free range can be provided and when there is a special market near by.

MORE POULTRY ON THE FARM TABLE.

As a matter of business foresight and economy, as well as of patriotism, farmers who increase their production of poultry and eggs this year should plan to use a considerable part of the increase on their own tables. Much of the benefit of increasing the supply of products capable of very rapid increase, but perishable and bulky, will be lost if producers adopt the policy of marketing all the increase. In that case there would be no substitution on the farm of poultry products for the cured and compact meats which it is desired to reserve as far as possible for military use and shipment to the Allies.

Many farm families could easily use several times as much poultry as is now consumed on the average farm. Analysis of the figures of the last census shows a very light consumption of poultry and eggs on the average farm. For the whole country the average yearly consumption of eggs per farm is only 137.5 dozen—2.6 dozen per week; of poultry 60 head—or one bird every six days. The highest average consumption of eggs in any state is 211.2 dozen—4 dozen a week. The highest average consumption of poultry in a state is 124.6 head—one bird in 2.9 days. Such averages indicate that farmers who use poultry and eggs freely on their own tables use from 6 to 10 dozen eggs and 4 to 6 head of poultry weekly. In view of the extent to which large stocks can be made self-sustaining during the greater part of the year on most farms, this liberal scale of consumption of poultry products would seem practical generally.

The consumption of eggs on farms may be greatly increased and farmers still receive the benefit of good prices for fresh eggs in the season of scant production and give consumers the benefit of a larger supply and more moderate prices, if all farmers who can do so will preserve as many eggs when eggs are cheap as they can use at home when eggs are dear. The average farm price of eggs in the United States in April, May, and June, 1917, was 29 cents a dozen; in October, November, and December, 38.7 cents. In 1916 the average difference

in farm prices in the periods compared was 12.3 cents a dozen. There is a period of from five to six months in every year when the average price for fresh eggs on the farm is about 10 cents a dozen more than the average price during the season of heavy production. Inasmuch as eggs can be preserved in water glass, or in lime water, and kept in good condition for from six to nine months, and usable for a year or more, a farmer who preserves eggs when they are cheap for his own use can use eggs freely the year round and still have eggs to sell all through the season of high prices.

ORGANIZATION TO INCREASE PRODUCTION.

Upon the declaration of war in April of last year the organizations of poultry keepers, the poultry and agricultural press, the poultry departments of State agricultural colleges and experiment stations, and the United States Department of Agriculture engaged in cooperative efforts to stimulate increased production of poultry and eggs.

At present thirty-nine poultry extension agents appointed by the United States Department of Agriculture are at work in thirty-five States, under the State directors of extension work, and eleven poultry club agents are cooperating with the poultry departments of the agricultural colleges in eleven States.

The poultry extension agents are expected to make the greatest effort in the grain-producing States, where the possibilities of large increase at low cost are greatest. Their special work is to organize new forces which will directly assist in poultry production.

The poultry club agents aim especially to organize and instruct the boys and girls. About 15,000 boys and girls are already enrolled in poultry clubs and helping to produce eggs and poultry. Community poultry breeding associations have also been organized among the parents of these boys and girls. The community breeding circle is intended to direct interest to the varieties of poultry best adapted to the farm conditions in the community and to encourage the production of the classes of poultry products which sell best in the most accessible markets.

To meet a demand for information resulting from a widening interest in poultry, the service of the Office of Information of the Department of Agriculture has been extended to a large list of general newspapers. Through these it is expected not only to increase the army of poultry producers, but also to increase greatly the consumption of poultry and eggs in cities.

